

# Assessment Guidelines for TABLE A-III/1

Specification for minimum standard of competency

## Proficiency in Officer in Charge of an Engineering Watch in a manned engine room or designated duty engineers in a periodically unmanned engine room

### Introduction

In order to demonstrate competency as an Officer in Charge of an Engineering Watch, candidates must meet the minimum standards of competence set out in STCW Code of Table A-III/1. Table A-III/1 has four functional areas: (1) marine engineering at the operational level; (2) electrical, electronic and control engineering at the operational level; (3) maintenance and repair at the operational level; and, (4) controlling the operation of the ship and care for persons on board at the operational level. Within each functional area there are component competencies comprised of knowledge, understanding and proficiency requirements. Each candidate must demonstrate the required minimum standard of competence for every knowledge, understanding or proficiency requirement.

### Proficiency (skill) demonstrations

As part of the in Officer in Charge of an Engineering Watch assessment, each candidate must perform every required proficiency demonstration using actual equipment or an approved full mission or other approved simulator. These assessment guidelines establish the conditions under which the proficiency (skill) assessment will occur, the performance or behavior the candidate is to accomplish, and the standards against which the performance is measured and assessed. Where indicated, a checklist is necessary to conduct the assessment. Checklists allow a training institution or designated examiner to ensure that critical tasks are not overlooked when evaluating a candidate's practical demonstration and also ensures that there is reasonable consistency between assessments of candidates.

In addition, for this table and its competencies, the unique operating, maintenance and repair requirements of different manufacturers, different generations and configurations of systems, and the specific nature of the shipboard installation did not permit the development of detailed performance criteria. As a result, many of the performance standards and criteria in these guidelines call for direct reference to the manufacturer's instructions, recommendations and specifications or the ship's standard operating procedures to determine if the candidate's actions were appropriate, complete, timely and executed in the proper sequence. In these instances, the role of assessor-developed checklists reflecting manufacturer's instructions, recommendations and specifications or the ship's standard operating procedures are critical.

### Proficiencies (skills) that must be assessed wholly or in part through practical demonstration:

#### Function: Marine engineering at the operational level

1. Characteristics and limitations of materials used in construction and repair of ships and equipment;
2. Characteristics and limitations of processes used for fabrication and repair;
3. Properties and parameters considered in the fabrication and repair of systems and components;
4. Application of safe working practices in the workshop environment;

5. Operational characteristics of equipment and systems;
6. Safety requirements for working on shipboard electrical systems;
7. Construction and operational characteristics of shipboard AC and DC electrical systems and equipment;
8. Construction and operation of electrical test and measuring equipment;
9. Duties associated with taking over and accepting a watch;
10. Safety precautions to be observed during a watch and immediate actions to be taken in the event of a fire or accident, with particular reference to oil system;
11. Preparation of main machinery and auxiliary machinery for operation;
12. Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties;
13. Operation of steam boilers, including combustion system;
14. Methods of checking water level in steam boilers and necessary action to be taken if water level is abnormal;
15. Operation of bilge, ballast, and cargo pumping systems;
16. Routine pumping operations.

Function: Electrical, electronic and control engineering at the operational level

1. Preparing, starting, coupling and changing over alternators or generators.

Function: Maintenance and repair at the operational level

1. Marine systems: Appropriate basic mechanical knowledge and skills;
2. Undertake maintenance and repair to plant and equipment.

Function: Controlling the operation of the ship and care for persons on board at the operational level

1. Anti-pollution procedures to be taken to prevent pollution of the marine environment.

**Knowledge and understanding that must be wholly or partially assessed through written examination:**

The following knowledge- and understanding-based competencies or competency components may be assessed through a written multiple-choice examination. The candidate must achieve a minimum grade of 70% in each knowledge or understanding component of the competency.<sup>(1)</sup>

Function: Marine engineering at the operational level

1. Characteristics and limitations of materials used in construction and repair of ships and equipment;
2. Characteristics and limitations of processes used for fabrication and repair;
3. Properties and parameters considered in the fabrication and repair of systems and components;
4. Design characteristics and selection of materials in construction of equipment;
5. Interpretation of machinery drawings and handbooks;

6. Thorough knowledge of principles to be observed in keeping an engineering watch;
7. Safety and emergency procedures; change over from remote/automatic to local control systems;
8. Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties;
9. Preparation of main machinery and auxiliary machinery for operation;
10. Operation of steam boilers, including combustion systems;
11. Methods of checking water levels in steam boilers and necessary action to be taken if water level is abnormal;
12. Location of common faults in machinery and plant in engine and boiler rooms and action necessary to prevent damage;
13. Pumping systems, routine pumping operations, and operation of bilge, ballast and cargo pumping systems.

Function: Electrical, electronic and control engineering at the operational level

1. Generating plants: Basic electrical knowledge and skills; preparing, starting, coupling and changing over alternators or generators; and location of common faults and action to prevent damage;
2. Control systems: Location of common faults and action to prevent damage.

Function: Maintenance and repair at the operational level

1. Marine systems: basic mechanical knowledge and skills;
2. Safe isolation of electrical and other types of plant and equipment required before personnel are permitted to work on such plant or equipment;
3. Maintenance and repair to plant and equipment.

Function: Controlling the operation of the ship and care for persons on board at the operational level

1. Prevention of pollution of the marine environment: precautions to be taken to prevent pollution; and anti-pollution procedures and all associated equipment;
2. Ship stability: Knowledge and application of stability, trim and stress tables, diagrams and stress calculating equipment; fundamentals of watertight integrity; and, actions to be taken in the event of partial loss of intact buoyancy;
3. Ship construction: Principal structural members of a ship and proper names for the various parts.

<sup>(1)</sup> In order to satisfy STCW every candidate must demonstrate the minimum standard for each knowledge, understanding and proficiency (skill) component (Table A-III/1, Column 2) of a required competence (Table A-III/1, Column 1). A minimum score of 70% must be achieved within each knowledge, understanding and proficiency (skill) component to meet the minimum specification of competence. Minimum competence is not achieved by demonstrating 70% of the knowledge, understanding and proficiency (skill) components in the table, and in no case will a candidate be considered competent if any single knowledge, understanding and proficiency (skill) component can not be successfully demonstrated. Therefore, if only one instructionally valid question is asked for a required knowledge or understanding component and the candidate provides an incorrect response, the candidate has not satisfied the knowledge or understanding requirement. In contrast, if four instructionally valid and distinct questions

are asked in a required knowledge or understanding component and the candidate provides one incorrect response, the candidate has achieved a score of 75% in that knowledge or understanding requirement and demonstrated minimum competence.

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Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
Use appropriate tools for fabrication and repair operations typically performed on ships	<p>Characteristics and limitations of materials used in construction and repair of ships and equipment.</p> <p>Characteristics and limitations of processes used for fabrication and repair.</p> <p>Properties and parameters considered in the fabrication and repair of systems and components.</p> <p>Application of safe working practices in the workshop environment.</p>	In a workshop/laboratory or other safe working environment, given proper tools, lighting, ventilation, and a thin steel plate of no less than 1/4 inch thickness,	the candidate will plan, prepare and safely cut a 3" circular hole in the plate using oxyacetylene process and describe actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. All required equipment is set up and the job is properly laid out.</li> <li>3. The hole is cut according to plan and is within tolerance of +/-1/8 inch.</li> <li>4. Actions being executed are described correctly as they are being performed.</li> <li>5. No safety violations are observed.</li> </ol>
		In a workshop/laboratory or other safe working environment, given proper tools, lighting, ventilation, and two brass or bronze plates of no less than 1/8 inch thickness,	the candidate will plan, prepare and form two plates with a fillet joint design using the brazing process and describe actions as they are being performed.	<ol style="list-style-type: none"> <li>1. All required equipment is set up and the job is properly laid out.</li> <li>2. The candidate selects correct flux material and proper heat.</li> <li>3. Plates are formed according to plan and the finished joint has no evidence of lack of fill, flux entrapment, non-continuous fillet, base metal</li> </ol>

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				erosion, base cracks or other defects. 4. Actions being executed are described correctly as they are being performed. 5. No safety violations are observed.
		In a workshop/laboratory or other safe working environment, given proper tools, lighting, ventilation, and two steel plates of no less than 3/8 inch thickness,	the candidate will plan, prepare and form two steel plates with a T-joint design in a vertical position using an electric arc welding process and describe actions as they are being performed.	1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations. 2. All required equipment is set up and the job is properly laid out. 3. Plates are formed according to plan and the finished joint has no evidence of lack of fill, flux entrapment, non-continuous fillet, base metal erosion, base cracks or other defects. 4. Actions being executed are described correctly as they are being performed. 5. No safety violations are observed.

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Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
		In a workshop/laboratory or other safe working environment, given proper tools, lighting, ventilation, and ½ inch copper tube and coupling,	the candidate will plan, prepare and make a sweat joint forming the copper tube and coupling and describe actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. All required equipment is set up and the job is properly laid out.</li> <li>3. The tubing is formed according to plan and the finished joint has no evidence of lack of fill, flux entrapment, non-continuous fillet, base metal erosion, base cracks or other defects.</li> <li>4. Actions being executed are described correctly as they are being performed.</li> <li>5. No safety violations are observed.</li> </ol>
		In a workshop/laboratory or other safe working environment, given ½ inch copper tube of at least 10 inches long, proper tools, and lighting,	the candidate will plan, prepare and form a 90 degree bend on the copper tube using tube bender.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. All required equipment is set up and the job is properly laid out.</li> <li>3. The copper tube is properly bent (proper angle achieved</li> </ol>

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				+/- 2 degrees and bend is free of defects and kinks). 4. Actions being executed are described correctly as they are being performed. 5. No safety violations are observed.
		In a workshop/laboratory or other safe working environment, given proper tools and supplies,	the candidate will plan, prepare and conduct a visual test on a welded joint and perform a bend test (or macroscopic, or nick break test techniques) on a welded joint, and report the result of the test.	1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations. 2. All required equipment is set up and the job is properly laid out. 3. The specimen is tested according to plan. 4. Actions being executed are described correctly as they are being performed. 5. The correct test finding is reported. 6. No safety violations are observed.



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		In a workshop/laboratory or other safe working environment, given proper tools and supplies,	the candidate will plan, prepare and conduct a non-destructive test on a welded joint, a dye-penetrant test on a welded joint, and report the result of tests.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. All required equipment is set up and the job is properly laid out.</li> <li>3. The specimen is tested according to plan.</li> <li>4. Actions being executed are described correctly as they are being performed.</li> <li>5. The correct test finding is reported.</li> <li>6. No safety violations are observed.</li> </ol>
Use hand tools and measuring equipment for dismantling, maintenance, repair and re-assembly of shipboard plant and equipment	Operational characteristics of equipment and systems.	In a workshop/laboratory or other safe working environment, given a drilling machine, proper tools, lighting, ventilation, and steel stock of no less than 1-inch thickness,	the candidate will plan, prepare and drill a ½ inch diameter blind hole ¾ of an inch deep, perpendicular to the surface using a drilling machine, and describe actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. The hole is drilled according to plan, round and within tolerance of +/- 1/64 inch.</li> <li>3. Actions are described correctly as they are being performed.</li> <li>4. No safety violations are observed.</li> </ol>

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		In a workshop/laboratory or other safe working environment, given a drilling machine, proper tools, lighting, ventilation, and steel stock of no less than 1-inch thickness, with a ½ inch diameter blind hole perpendicular to the surface,	The candidate will plan, prepare and thread a blind hole using a set of hand taps and describe actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. The hole is tapped according to plan, is threaded entire depth and holds a bolt perpendicular to the surface.</li> <li>3. Actions being executed are described correctly as they are being performed.</li> <li>4. No safety violations are observed.</li> </ol>
		In a workshop/laboratory or other safe working environment, given a hand die, proper tools, lighting, ventilation, and steel round stock of no less than 3/8 inch diameter,	the candidate will plan, prepare and make an external thread using a hand die and describe actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. The thread is made according to plan and the axes of the thread and stock are co-linear.</li> <li>3. Actions are described correctly as they are being performed.</li> <li>4. No safety violations are observed.</li> </ol>

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Use hand tools, electrical and electronic measuring and test equipment for fault finding, maintenance and repair operations	<p>Construction and operational characteristics of shipboard AC and DC electrical systems and equipment.</p> <p>Construction and operation of electrical test and measuring equipment.</p> <p>Safety requirements for working on shipboard electrical systems.</p>	Given a voltmeter, ammeter, ohmmeter, simple circuit with a power source, and a schematic of the circuit with at least 5 components indicated,	the candidate will outline a plan and use the test equipment to report voltage, amperage and resistance readings related to the components indicated, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. The test equipment is properly calibrated.</li> <li>3. Actions are described correctly as they are being performed.</li> <li>4. Readings reported are within 1% of the assessor's readings.</li> <li>5. No safety violations are observed.</li> </ol>
		Aboard ship or in a workshop, given the schematic of and access to the electrical distribution system, proper tools and safety equipment,	the candidate will find and explain the components, the operating characteristics, and perform measurements or troubleshoot a fault of the electrical distribution system.	<p>The candidate will:</p> <ol style="list-style-type: none"> <li>1. correctly locate the components;</li> <li>2. correctly explain the components and their operating characteristics;</li> <li>3. correctly perform measurements;</li> <li>4. correctly troubleshoot a fault; and,</li> <li>5. ensure that no safety violations are observed.</li> </ol>

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		Aboard ship or in a workshop, given access to an electrical distribution system, and proper tools and safety equipment,	the candidate will plan and carry out a logical procedure to detect the location of grounds, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. Actions being executed are described correctly as they are being performed.</li> <li>3. The logic path followed progressively eliminates or reduces possible grounding sources.</li> <li>4. Grounding source(s) are correctly identified.</li> <li>5. No safety violations are observed .</li> </ol>
		Aboard ship or in a workshop, given access to 3-phase electrical AC motor and controller, a Megger test meter, and other proper tools and safety equipment,	the candidate will plan and use the Megger to measure and record the resistance of the motor through connections in the controller, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</li> <li>2. Actions being executed are described correctly as they are being performed.</li> <li>3. The system is confirmed DE-ENERGIZED and the Megger is used correctly in accordance with manufacturer's instructions.</li> <li>4. The resistance value</li> </ol>

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Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>reported is corrected for temperature and within +/- 5% of the assessor's solution.</p> <p>5. No safety violations are observed.</p>
		Aboard ship or in a workshop, given access to 3-phase electrical AC motor controller, a phase sequence indicator, and other proper tools and safety equipment,	the candidate will plan and use the phase sequence indicator to determine and report the phase rotation, describing actions as they are being performed.	<p>1. The plan and layout of the job are correct, in proper sequence, and incorporate all safety considerations.</p> <p>2. Actions being executed are described correctly as they are being performed.</p> <p>3. The phase sequence indicator is used correctly and in accordance with manufacturer's instructions.</p> <p>4. The phase rotation reported is correct.</p> <p>5. No safety violations are observed.</p>
Maintain safe engineering watch	Duties associated with taking over and accepting a watch.	Aboard a ship which has main propulsion machinery of 750 kW or more, while underway in an engine room,	the candidate will conduct an inspection of machinery spaces before taking the engine room watch.	<p>1. The status or condition of the main and auxiliary machinery (including fuel, feed water, and exhaust systems), control systems, indicating panels and communication systems are</p>

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Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>correctly determined, described and reported.</p> <p>2. The status and condition of the steering system and all associated gear are determined, described, and reported.</p> <p>3. The condition of the bilges with respect to water level and contamination is determined, described, and reported.</p> <p>4. No safety violations are observed.</p>
		<p>Aboard ship while underway, or in an approved simulator, given the engineering log book, the pertinent standing orders and proper safety equipment,</p>	<p>the candidate will assume the engineering watch in accordance with STCW Code (A-VIII/2 part 3-2), describing each step as executed and making all necessary inspections and site visits required to understand and verify the status of the watch.</p>	<p>1. All standing orders and special instructions are read and understood and descriptions to the assessor are correct, complete and indicate clear understanding of duties involved.</p> <p>2. All work being performed on machinery and systems, personnel involved and potential hazards in the engine room are identified and described to the assessor completely and correctly with watch implications</p>

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Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>clearly explained.</p> <p>3. Levels of the following are correctly reported:</p> <p>a. bilges;</p> <p>b. ballast tanks;</p> <p>c. slop tanks;</p> <p>d. reserve feed tanks;</p> <p>e. fresh water tanks, and,</p> <p>f. sewage tanks.</p> <p>4. The condition and level of fuel are correctly reported for the following:</p> <p>a. reserve tanks;</p> <p>b. settling tanks;</p> <p>c. day tanks; and,</p> <p>d. other fuel storage facilities.</p> <p>5. Special requirements relating to sanitary system disposals are verified and correctly reported.</p> <p>6. The condition and mode of operation of all main, auxiliary, stand-by and emergency equipment are verified and correctly reported.</p> <p>7. The condition of monitoring and control console</p>

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Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>equipment, including equipment being operated manually are identified and correctly reported.</p> <p>8. Where applicable, the condition and mode of operation of the automatic boiler controls such as flame safeguard control systems, limit control systems, combustion control system, fuel supply control systems and other equipment related to the operation of the steam boilers are identified and correctly reported.</p> <p>9. Potentially adverse conditions resulting from bad weather, ice or contaminated or shallow water are verified and appropriate actions are taken.</p> <p>10. Special modes of operation dictated by equipment failure or adverse ship conditions are verified and reported.</p> <p>11. The report of the engine</p>



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				<p>room ratings to their assigned duties is verified and reported.</p> <p>12. Availability of fire fighting appliances is verified and reported.</p> <p>13. The candidate ensures that the members of the relieving engineering watch are capable of performing their duties effectively.</p>
	Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil system.	Aboard ship or in a suitable engine room simulator, given appropriate alarms, and upon hearing each of the following engine room alarms,	<p>the candidate will name the alarm, acknowledge the alarm, confirm the condition indicated by the alarm and take appropriate action to correct the alarm condition:</p> <ul style="list-style-type: none"> <li>• Low lubrication oil pressure alarm;</li> <li>• Low jacket water pressure alarm;</li> <li>• High lubrication oil temperature alarm;</li> <li>• General alarm; and,</li> <li>• Mist detector.</li> </ul>	<p>The candidate:</p> <ol style="list-style-type: none"> <li>1. correctly identifies each alarm;</li> <li>2. correctly acknowledges each alarm;</li> <li>3. correctly confirms each alarm condition;</li> <li>4. ensures timely action is taken to correct each indicated alarm condition;</li> <li>5. clears an alarm when corrective actions have been taken; and,</li> <li>6. ensures that no safety or environmental violations occur.</li> </ol>

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Use English in written and oral form	Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties.	<p><u>Non-standard Note:</u> The reading comprehension requirement is considered to have been met when the candidate passes an orally unassisted written U.S. Coast Guard examination for the license for which the endorsement is sought.</p> <p>If this qualification is not met, the alternative method listed below may be used at the discretion of the assessor.</p>		
		<p><u>Alternative Method of Demonstrating Competency:</u>  In a suitable classroom or other testing environment and given any approved, commercially available and recognized English language reading comprehension test instrument,</p>	the candidate will complete the reading comprehension test instrument in accordance with the instructions and conditions specified in the test instrument instructions.	The candidate achieves the minimum score specified in the approval for the test instrument administered.
		<p><u>Non-standard Note:</u> The listening component of the oral comprehension requirement is considered to have been met when the candidate complies with the</p>		

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		<p>instructions and directions of the assessor during the assessment process for this table administered in English.</p> <p>If this qualification is not met, the alternative method listed below may be used at the discretion of either assessor or the candidate.</p>		
		<p><u>Alternative Method of Demonstrating Competency:</u>  In a suitable classroom or other testing environment and given any approved, commercially available and recognized English language listening comprehension test instrument,</p>	<p>the candidate will complete the listening comprehension test instrument bank in accordance with the instructions and conditions specified in the test instrument instructions.</p>	<p>The candidate achieves the minimum score specified in the approval for the test instrument administered.</p>
		<p><u>Non-standard Note:</u> The speaking skills component of the oral comprehension requirement is considered to have been met when the candidate successfully completes an assessor checklist requirement in each demonstration to correctly describe actions as they are</p>		

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		being performed or demonstrated in English.  If this qualification is not met, the alternative method listed below may be used at the discretion of either assessor or the candidate.		
		<u>Alternative Method of Demonstrating Competency:</u> In a suitable classroom or other testing environment and given any approved, commercially available and recognized English language speaking skills test instrument,	the candidate will complete the reading comprehension test instrument bank in accordance with the instructions and conditions specified in the test instrument instructions.	The candidate achieves the minimum score specified in the approval for the test instrument administered.
Operate main and auxiliary machinery and associated control systems	Preparation of main machinery and of auxiliary machinery for operation.	Aboard ship in port at the steering room station or in an approved simulator,	the candidate will plan, describe and conduct an operational steering gear test, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of regulations, manufacturer's instructions and ship's procedures.</li> <li>2. The operational steering gear test is conducted according to plan and all reports of observations and tests are accurate and complete.</li> </ol>

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Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				3. Actions taken are correctly and completely described. 4. Required steps taken are verified by assessor utilizing a sample checklist as a guide. 5. No safety violations are observed.
		Aboard ship or using an approved simulator, and given access to a refrigeration system that has been secured,	the candidate will plan for and start up a refrigeration system, describing actions as they are being performed.	1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures. 2. Start up of the refrigeration system is successful and conducted according to plan. 3. Actions taken are correctly and completely described. 4. Required steps taken are verified by assessor utilizing a sample checklist as a guide. 5. No safety violations are observed.
		Aboard ship or using an approved simulator, and given access to an operating	the candidate will plan for and shut down a refrigeration system, describing actions as	1. The plan reflects proper sequence of actions, is complete, and conforms to

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
		refrigeration system,	they are being performed.	<p>the requirements of manufacturer's instructions and ship's procedures.</p> <ol style="list-style-type: none"> <li>2. Shut down of the refrigeration system is successful and conducted according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol>
		Aboard ship or using an approved simulator, and given access to an air compressor,	the candidate will plan for and start up the compressor, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Start up of the compressor is successful and conducted according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a</li> </ol>

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**Specification of minimum standard of competence**

**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				guide. 5. No safety violations are observed.
		Aboard ship or using an approved simulator, and given access to an air compressor,	the candidate will plan for and shut down the compressor, describing actions as they are being performed.	1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures. 2. Shut down of the compressor is successful and conducted according to plan. 3. Actions taken are correctly and completely described. 4. Required steps taken are verified by assessor utilizing a sample checklist as a guide. 5. No safety violations are observed.
		Aboard ship or using an approved simulator, and given access to a fresh water generator,	the candidate will plan for and start up the fresh water generator, describing actions as they are being performed.	1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures. 2. Start up of the fresh water generator is successful and

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>conducted according to plan.</p> <p>3. Fresh water is generated and water salinity is under 4.24 ppm.</p> <p>4. Actions taken are correctly and completely described.</p> <p>5. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>6. No safety violations are observed.</p>
		Aboard ship or using an approved simulator, and given access to a fresh water generator,	the candidate will plan for and shut down the fresh water generator, describing actions as they are being performed.	<p>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</p> <p>2. Shut down of the fresh water generator is successful and conducted according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety violations are observed.</p>



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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
		Aboard ship or using an approved simulator, and given access to a fuel oil or lube oil purifier,	the candidate will plan for and start the purifier, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Start up of the purifier is successful and conducted according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol>
		Aboard ship or using an approved simulator, and given access to a running fuel oil or lube oil purifier,	the candidate will plan for and secure the purifier, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Securing of the purifier is successful and conducted according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are</li> </ol>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety violations are observed.</p>
		<p>Aboard a ship in port or at anchor, or in an approved simulator, and given access to a main propulsion diesel engine,</p>	<p>the candidate will plan for and prepare a main propulsion diesel engine for operation, describing actions as they are being performed.</p>	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Preparation of the main propulsion diesel engine for operation is successful and conducted according to plan*.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol> <p>* (Note: Because of the physical separations and complexity of the tasks involved in demonstration of this</p>

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**Specification of minimum standard of competence**

**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				proficiency, the assessment may be accomplished in segments during successive operational opportunities aboard ship.)
		Aboard a ship in port or at anchor, or in an approved simulator, and given access a main propulsion diesel engine,	the candidate will plan for and secure a main propulsion diesel engine, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Securing of the main propulsion diesel engine is successful and conducted according to plan*.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol> <p>* (Note: Because of the physical separations and complexity of the tasks involved in demonstration of this proficiency, the assessment may be accomplished in segments</p>

**STCW Table A-III/1 Guidelines for Assessment**  
**Specification of minimum standard of competence**

**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				during successive operational opportunities aboard ship.)
		Aboard a ship in port or at anchor, or in an approved simulator, and given access to a main steam turbine,	the candidate will plan for and prepare a main steam turbine for operation, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Preparation of the main steam turbine for operation is successful and conducted according to plan*.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol> <p>* (Note: Because of the physical separations and complexity of the tasks involved in demonstration of this proficiency, the assessment may be accomplished in segments during successive operational</p>

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**Specification of minimum standard of competence**

**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				opportunities aboard ship.)
		Aboard a ship at sea or in an approved simulator, given access to a main steam turbine,	the candidate will plan for and monitor an operating main steam turbine, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. The main steam turbine is successfully monitored according to plan*.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol> <p>* (Note: Because of the physical separations and complexity of the tasks involved in demonstration of this proficiency, the assessment may be accomplished in segments during successive operational opportunities aboard ship.)</p>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
		Aboard a ship in port or at anchor, or in an approved simulator, and given access to a main steam turbine,	the candidate will plan for and secure a main steam turbine, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. The main steam turbine is successfully secured and conducted according to plan*.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol> <p>* (Note: Because of the physical separations and complexity of the tasks involved in demonstration of this proficiency, the assessment may be accomplished in segments during successive operational opportunities aboard ship.)</p>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
	Operation of steam boilers, including combustion system.	Aboard a ship in port or at anchor, or in an approved simulator, and given access to a main boiler,	the candidate will plan for and demonstrate the duties involved in "lighting off" a main boiler, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. The "lighting off" of the main boiler is successful and conducted according to plan*.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol> <p>* (Note: Because of the physical separations and complexity of the tasks involved in demonstration of this proficiency, the assessment may be accomplished in segments during successive operational opportunities aboard ship.)</p>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
		Aboard a ship in port or at anchor, or in an approved simulator, and given access to a main boiler,	the candidate will plan for and secure a main boiler, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Securing of the boiler is successful and conducted according to plan*.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol> <p>* (Note: Because of the physical separations and complexity of the tasks involved in demonstration of this proficiency, the assessment may be accomplished in segments during successive operational opportunities aboard ship.)</p>
		Aboard a ship in port or at anchor, or in an approved simulator, and given access to	the candidate will perform a bottom blow of a boiler.	<ol style="list-style-type: none"> <li>1. Operations are planned and carried out in accordance with manufacturer's</li> </ol>



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Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
		a main boiler,		<p>instructions and ship's procedures to ensure safety of operations and avoid pollution of the environment.</p> <ol style="list-style-type: none"> <li>The task is correctly completed and described.</li> <li>No safety violations are observed.</li> </ol>
		Aboard a ship in port or at anchor, or in an approved simulator, and given access to a main boiler,	<p>the candidate will test the boiler water for the following:</p> <ul style="list-style-type: none"> <li>phenolphthalein alkalinity;</li> <li>total alkalinity;</li> <li>chloride;</li> <li>phosphate;</li> <li>hardness;</li> <li>pH value;</li> <li>dissolved oxygen;</li> <li>total dissolved solids;</li> <li>and,</li> <li>hydrazine</li> </ul>	<p>The candidate:</p> <ol style="list-style-type: none"> <li>correctly explains the reason and importance for testing;</li> <li>correctly identifies the source, amount, and temperature of the sample;</li> <li>correctly identifies the chemicals and amount;</li> <li>correctly performs the test procedure and records the results;</li> <li>correctly identifies corrective actions associated with the results if applicable; and,</li> <li>ensures no safety violations are observed.</li> </ol>
	Methods of checking water level in steam boilers and necessary action to be taken if	Aboard a ship in port or at anchor, or in an approved simulator, and given access to	the candidate will check and report the boiler water level, describing actions as they are	<ol style="list-style-type: none"> <li>The reported reading is +/- 1 inch of and conducted according to plan.</li> </ol>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
	water level is abnormal.	a main or auxiliary boiler,	being performed.	<ol style="list-style-type: none"> <li>2. Actions taken are correctly and completely described.</li> <li>3. No safety violations are observed.</li> </ol>
		Aboard a ship in port or at anchor, or in an approved simulator, and given access to a main or auxiliary boiler,	the candidate will plan for and respond to a boiler high water alarm, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. The response to the high water alarm is timely, effective and conducted according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol>
		Aboard a ship in port or at anchor, or in an approved simulator, and given access to a main or auxiliary boiler,	the candidate will plan for and respond to a boiler low water alarm, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Response to the low water</li> </ol>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>alarm is timely, effective and conducted according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety violations are observed.</p>
Operate pumping systems and associated control systems	Routine pumping operations.	Aboard a ship in port or at anchor, or in an approved simulator, and given proper fuel oil transfer procedures and equipment,	the candidate will plan for and conduct an onboard fuel transfer, describing actions as they are being performed.	<p>1. The plan reflects proper sequence of actions, is complete, and conforms to ship's procedures.</p> <p>2. The fuel transfer is conducted according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety or pollution violations are observed.</p>
		Aboard ship in port or at anchor, or in an approved simulator, and given a piping diagram for the vessel and ballast pumping procedures,	the candidate will plan for and conduct a ballasting operation, describing actions as they are being performed.	<p>1. The plan reflects proper sequence of actions, is complete, and conforms to ship's procedures.</p> <p>2. The ballasting is conducted</p>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety or pollution violations are observed.</p>
		Aboard a ship underway or in an approved simulator, and given the piping diagram for the vessel and ballast pumping procedures,	the candidate will plan for and conduct a deballasting operation, describing actions as they are being performed.	<p>1. The plan reflects proper sequence of actions, is complete, and conforms to ship's procedures.</p> <p>2. The deballasting is conducted according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety or pollution violations are observed.</p>
	Operation of bilge, ballast and cargo pumping systems.	Aboard ship in port, at anchor or while underway, or in an approved simulator, and given the engineering log book, the pertinent standing orders, the oil record book,	the candidate will plan for and pump out the engine room bilge wells describing actions as they are being performed.	<p>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of ship's procedures.</p> <p>2. The engine room wells are</p>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

Function: Marine engineering at the operational level

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
		and proper safety equipment,		<p>pumped according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety or pollution violations are observed.</p>
		Aboard a ship in port, at anchor or while underway, or in an approved simulator, and given the engineering log book, the pertinent standing orders, the oil record book, and proper safety equipment,	the candidate will plan for and pump out a cargo hold or the shaft alley bilge wells.	<p>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of ship's procedures.</p> <p>2. The cargo hold or shaft alley bilge wells are pumped according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety or pollution violations are observed.</p>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

**Function: Electrical, electronic and control engineering at the operational level**

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
Operate alternators, generators and control systems	Preparing, starting, coupling and changing over alternators or generators.	Aboard ship in port, at anchor, or underway, or in an approved simulator, given access to generator and proper tools,	the candidate will plan for and manually start the emergency generator, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Start up of the emergency generator is successful and conducted according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol>
		Aboard ship in port, at anchor, or underway, or in an approved simulator given access to proper equipment and manufacturer's technical manual,	the candidate will plan for and conduct a pre-start-up inspection of a diesel generator, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. Pre-start up inspection of the prime mover and alternator is successful and conducted according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are</li> </ol>

**STCW Table A-III/1 Guidelines for Assessment**  
**Specification of minimum standard of competence**

**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

**Function: Electrical, electronic and control engineering at the operational level**

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				verified by assessor utilizing a sample checklist as a guide. 5. No safety violations are observed.
		Aboard ship in port or at anchor, or in an approved simulator, given access to proper equipment and manufacturer's technical manual,	the candidate will plan for and conduct a pre-start-up inspection of a steam turbo-generator describing actions as they are being performed.	1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures. 2. Pre-start up inspection of the steam turbo-generator is successful and conducted according to plan. 3. Actions taken are correctly and completely described. 4. Required steps taken are verified by assessor utilizing a sample checklist as a guide. 5. No safety violations are observed.
		Aboard a dead ship while in port or at sea, or in an approved simulator, given access to a generator and proper tools, approved instruction, and safe working environment,	the candidate will plan for, start and connect the ship service diesel generator to the main switchboard, describing actions as they are being performed.	1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures. 2. Start-up of the ship's service

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

**Function: Electrical, electronic and control engineering at the operational level**

Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>diesel generator is successful and conducted according to plan.</p> <p>3. Connections of the ship's service diesel generator to the main switchboard is successful and conducted according to plan.</p> <p>4. Actions taken are correctly and completely described.</p> <p>5. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>6. No safety violations are observed.</p>
		Aboard ship or in an approved simulator, given access to proper equipment and the manufacturer's technical manual,	the candidate will plan for and parallel an in-coming unit with operating unit, describing actions as they are being performed.	<p>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</p> <p>2. The paralleling of the on-coming unit with the operating unit is successful and conducted according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are</p>



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Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room

Function: Electrical, electronic and control engineering at the operational level

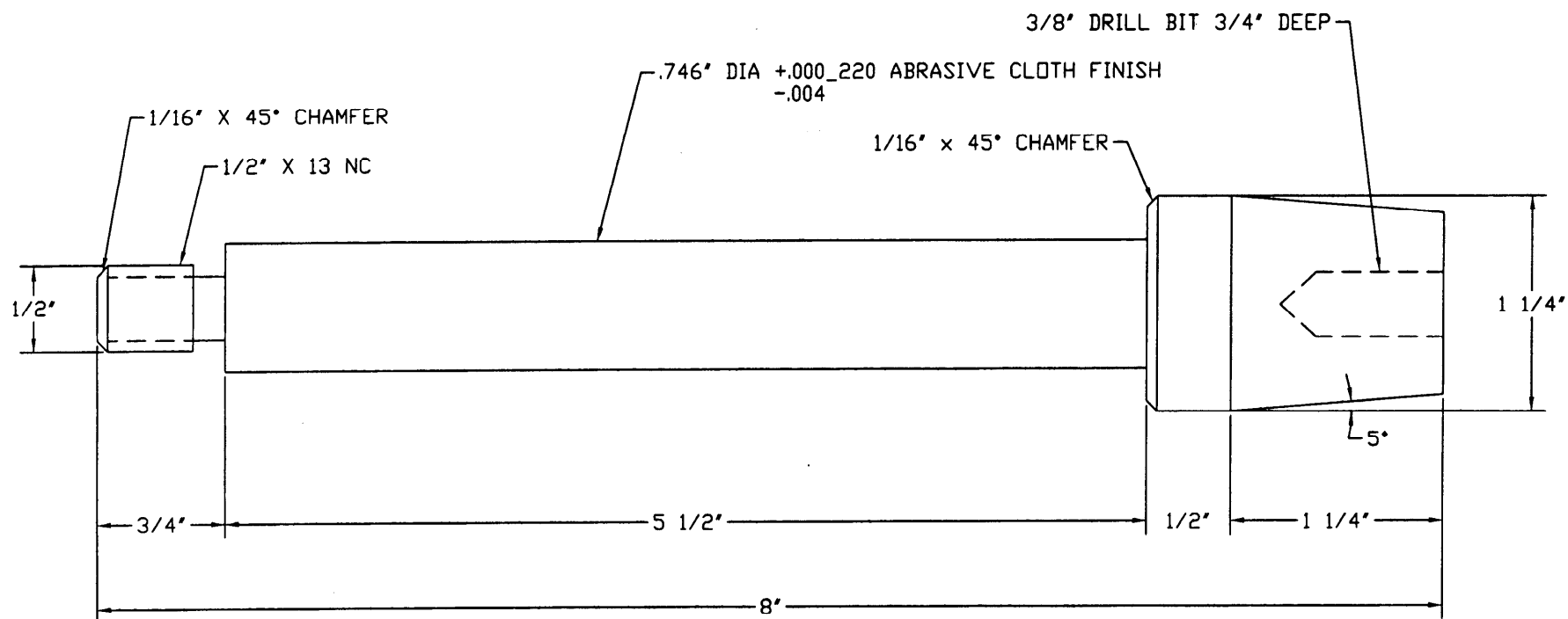
Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				<p>verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety violations are observed.</p>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

**Function: Maintenance and repair at the operational level**

STCW Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
Maintain Marine Engineering Systems, Including Control System	<i>Marine Systems</i> Appropriate basic mechanical knowledge and skills.	Aboard ship or in a workshop, given access to a lathe, mild steel rod stock and other necessary equipment and supplies,	the candidate will develop a plan and use the lathe to produce a project* in accordance with attached drawing (drawing #1), describing actions as they are being performed.  * Project requires proficiency in lathe principles, faceplates or chucks and centers, material removal, thread cutting, and taper turning.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions and is complete.</li> <li>2. Proper stock is selected and lathe operations are properly performed.</li> <li>3. The project is completed according to plan, within tolerances specified in the drawing.</li> <li>4. Actions taken are correctly and completely described.</li> <li>5. No safety violations are observed.</li> </ol>
	Undertake maintenance and repair to plant and equipment.	Aboard ship or in a workshop, given a centrifugal pump and other equipment, manuals and specifications needed to complete the task,	the candidate will develop a plan, dismantle the centrifugal pump, and perform the following maintenance, describing actions as they are being performed: <ol style="list-style-type: none"> <li>1. examine and measure all parts for wear and deterioration;</li> <li>2. re-fit and check all clearances; and,</li> <li>3. replace and adjust seals.</li> </ol>	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. The dismantling, examination and measurement, assessment of wear or deterioration, re-fitting and clearance checks, and replacement/adjustment of seals is successful and</li> </ol>



UNLESS OTHERWISE STATED:  
ALL DIMENSIONS ARE IN INCHES.  
TOLERANCES:  
DIM.  $\pm 1/32"$   
ANG.  $\pm 5^\circ$

MATERIAL  
STEEL

FINISH  
BREAK ALL  
SHARP EDGES

PROJECT 1

MODIFIED LESLIE  
REDUCING VALVE  
PLUG AND STEM

**Table A-III/1 Guidelines for Assessment**  
**Specification of minimum standard of competence**

**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

**Function: Maintenance and repair at the operational level**

				<p>conducted according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</p> <p>5. No safety violations are observed.</p>
		<p>Aboard ship or in a workshop, given a reciprocating pump and other equipment, manuals and specifications needed to complete the task,</p>	<p>the candidate will develop a plan, dismantle the reciprocating pump and perform the following maintenance on it, describing actions as they are being performed:</p> <ul style="list-style-type: none"> <li>• examine and measure all parts for wear and deterioration;</li> <li>• machine and grind valves and seats;</li> <li>• re-fit and check all clearances; and,</li> <li>• remove and re-fit gland packing.</li> </ul>	<p>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</p> <p>2. The dismantling, examination and measurement, assessment of wear or deterioration, re-fitting and clearance checks, and machining and grinding valves and seats, re-fitting, and replacement of gland packing is successful and conducted according to plan.</p> <p>3. Actions taken are correctly and completely described.</p> <p>4. Required steps taken are verified by assessor utilizing a sample checklist as a</p>

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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

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				guide. 5. No safety violations are observed.
		Aboard ship or in a workshop, given a gear pump and other equipment, manuals and specifications needed to complete the task,	the candidate will develop a plan, dismantle the gear pump, and perform the following maintenance on it, describing actions as they are being performed: <ul style="list-style-type: none"> <li>• examine and measure all parts for wear and deterioration;</li> <li>• re-fit and check all clearances; and,</li> <li>• replace and adjust seals.</li> </ul>	1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures. 2. The dismantling, examination and measurement, assessment of wear or deterioration, re-fitting and clearance checks, and replacement/adjustment of seals is successful conducted according to plan. 3. Actions taken are correctly and completely described. 4. Required steps taken are verified by assessor utilizing a sample checklist as a guide. 5. No safety violations are observed.
		Aboard ship or in a workshop, given a piping diagram and other equipment needed to complete the task,	the candidate will plan for and inspect a valve manifold, describing actions as they are being performed.	1. The plan reflects proper sequence of actions, is complete, and conforms with ship's procedures. 2. The candidate correctly:

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				<ul style="list-style-type: none"> <li>a. identifies contents of pipe;</li> <li>b. isolates pipe section;</li> <li>c. relieves pressure and drains pipe section;</li> <li>d. dismantles flanges and screwed connections;</li> <li>e. cleans and inspects interior of pipe;</li> <li>f. cleans and prepares joints for re-assembly;</li> <li>g. selects and applies jointing material;</li> <li>h. re-assembles;</li> <li>i. hydraulically tests;</li> <li>j. eliminates any leakage;</li> <li>k. checks pipe supports; and,</li> <li>l. checks lagging and checks shrouding, if used.</li> </ul> <ul style="list-style-type: none"> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ul>
		<p>Aboard ship or in a workshop, given one of the following types of valves:</p> <ul style="list-style-type: none"> <li>• safety valve;</li> </ul>	<p>the candidate will plan for and perform a maintenance overhaul on a valve, describing actions as they are</p>	<ul style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms with ship's procedures.</li> </ul>

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		<ul style="list-style-type: none"> <li>• steam trap;</li> <li>• quick closing valve;</li> <li>• drain valve; or,</li> <li>• relief valve,</li> </ul> <p>and other equipment needed to complete the task,</p>	being performed.	<ol style="list-style-type: none"> <li>2. The candidate correctly:               <ol style="list-style-type: none"> <li>a. examines seats, valves and glands;</li> <li>b. machines valves and seats beds in valves on seats using grinding paste;</li> <li>c. removes old gland packing;</li> <li>d. selects replacement gland packing;</li> <li>e. re-packs glands; and,</li> <li>f. tests, correcting any leakage.</li> </ol> </li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety or violations are observed.</li> </ol>
		Aboard ship or in a workshop, given a heat exchanger and other equipment needed to complete the task,	the candidate will plan for and perform an overhaul of the heat exchanger, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms with manufacturer's instructions and ship's procedures.</li> <li>2. The candidate correctly:               <ol style="list-style-type: none"> <li>a. dismantles and examines for leakage, corrosion, erosion and fouling;</li> </ol> </li> </ol>

**Table A-III/1 Guidelines for Assessment**  
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				b. checks provision for tube expansion, de-scaling, replacing and plugging tubes, and checking tube tightness and means for reducing corrosion; and, c. fills and tests heat exchanger, noting and correcting any problems. 3. Actions taken are correctly and completely described. 4. Required steps taken are verified by assessor utilizing a sample checklist as a guide. 5. No safety violations are observed.
		Aboard ship or in a workshop, given access to a scavenging air receiver and other equipment needed to complete the task,	the candidate will drain the scavenging air receivers of oil accumulation, describing actions as they are being performed.	1. The candidate: a. opens drains; b. collects oil accumulation; c. observes oil outflow; d. closes drain; and, e. disposes of oil. 2. Actions taken are correctly and completely described. 3. Required steps taken are verified by assessor utilizing a sample checklist as a guide. 4. No safety or environmental



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				violations are observed.
		Aboard ship or in a workshop, given access to a clutch air system and other equipment needed to complete the task,	the candidate will perform routine maintenance on start and clutch air system, describing actions as they are being performed.	<ol style="list-style-type: none"> <li>1. The candidate: <ol style="list-style-type: none"> <li>a. drains moisture separators and starts air and clutch tanks;</li> <li>b. detects abnormal conditions; and,</li> <li>c. blows down compressed air strainers.</li> </ol> </li> <li>2. Actions taken are correctly and completely described.</li> <li>3. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>4. No safety or environmental violations are observed.</li> </ol>

**Table A-III/1 Guidelines for Assessment**  
**Specification of minimum standard of competence**

**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

**Function: Controlling the operation of the ship and care for persons on board at the operational level**

STCW Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
Ensure compliance with pollution prevention requirements	Anti-pollution procedures to be taken to prevent pollution of the marine environment.	Aboard ship in port, at anchor or underway, or in an approved simulator, and given access to a sanitary flushing water system and proper tools and equipment,	the candidate will monitor the sanitary flushing water system.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. The sanitary flushing system is successfully monitored according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing a sample checklist as a guide.</li> <li>5. No safety violations are observed.</li> </ol>
		Aboard ship in port, at anchor, or underway, or in an approved simulator, and given access to a sewage waste treatment plant and proper tools and equipment,	the candidate will monitor the sewage waste treatment plant.	<ol style="list-style-type: none"> <li>1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures.</li> <li>2. The sewage waste treatment plant is successfully monitored according to plan.</li> <li>3. Actions taken are correctly and completely described.</li> <li>4. Required steps taken are verified by assessor utilizing</li> </ol>

**Table A-III/1 Guidelines for Assessment**  
**Specification of minimum standard of competence**

**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

**Function: Controlling the operation of the ship and care for persons on board at the operational level**

STCW Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
				a sample checklist as a guide. 5. No safety violations are observed.
		Aboard ship while underway or in an approved simulator, and given access to an oily water separator system and proper tools and equipment,	the candidate will monitor the oily water separator system.	1. The plan reflects proper sequence of actions, is complete, and conforms to the requirements of manufacturer's instructions and ship's procedures. 2. The oily water separator is successfully monitored according to plan. 3. Actions taken are correctly and completely described. 4. Required steps taken are verified by assessor utilizing a sample checklist as a guide. 5. No safety violations are observed.
Prevent, control and fight fires on board			The candidate will perform proficiencies in accordance with STCW Code (Section A-VI/3).	The candidate successfully completes the competencies in accordance with STCW Section A-VI/3. (Mandatory Minimum training in advanced fire fighting).

**Table A-III/1 Guidelines for Assessment**  
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**Officers in Charge of an Engineering Watch in a Manned Engine-room or Designated Duty Engineers in a Periodically Unmanned Engine-room**

**Function: Controlling the operation of the ship and care for persons on board at the operational level**

STCW Competence	Knowledge, understanding and proficiency	Performance Condition(s)	Performance Behavior	Performance Criteria
Operate lifesaving appliances.			The candidate will perform proficiencies in accordance with STCW Code (Section A-VI/2 para. 1-4).	<ol style="list-style-type: none"> <li>1. The candidate successfully completes the competencies in accordance with STCW Table A-VI/2 paragraphs 1-4 (Proficiency in survival craft and rescue boats other than fast rescue boats);</li> <li>2. No safety violations are observed.</li> </ol>
Apply medical first aid on board ship			The candidate will perform proficiencies in accordance with STCW Code (Section A-VI/4 para. 1-3).	The candidate successfully completes the competencies in accordance with STCW Section A-VI/4 para. 1-3 (Mandatory minimum requirements related to medical first aid and medical care).

**SHIPBOARD ASSESSMENTS  
AND  
OTHER RELATED PROFICIENCY ASSIGNMENTS  
FOR OFFICER IN CHARGE OF ENGINE ROOM WATCH**

**CHECKLIST**

**OFFICER IN CHARGE OF ENGINE ROOM WATCH**

**PROFICIENCY ASSESSMENTS**

\* The tables in the STCW National Performance Guidelines call for the use of assessor checklists in certain assessments in order to foster completeness of the assessment, and consistency and fairness between the assessments of various candidates. This sample checklist is for the use of assessors in developing their own checklists that reflect the specific equipment, and operating procedures and protocols that will be used or in place during the assessment. This sample checklist reflects the approach and general level of detail deemed necessary to achieve its intended purposes. The specific tasks, procedures and sequences shown in this sample checklist may differ from those in place at the assessment site. In those instances, it will be the assessor's responsibility to make the necessary adjustments so that the checklist used during the assessment fairly, accurately and completely reflects the components of the proficiency that demonstrated by the candidate to prove competence.

Once developed and finalized, the Assessor's checklist may be given to the candidate to use as a tool to learn or become familiar with the systems and procedures that will be used during the assessment. However, during the actual assessment the candidate may not refer to or otherwise use the checklist as a job aid.

***Testing operational steering gear in preparation for getting underway***

	Pass	Fail
1. Verifies that operating instructions are properly posted and accurate		
2. Checks oil sump levels (replenishes as needed) and generally makes an overall external safety inspection of the machinery and surrounding spaces.		
3. Establishes communication with personnel on bridge		
4. Energizes the equipment and tests the operation of each motor and pump assembly, using both port and starboard control cables		

5. Operates each motor and pump assembly from bridge, alternative control stations, and steering gear room through the full range of rudder travel (noting time per regulations) and using both follow-up and non-follow up controls.		
6. Operates each motor and pump assembly on the normal, alternate, and emergency power supplies, checking for proper operation of manual feeder transfer switch and automatic bus transfers		
7. Reports or notes unusual noise, vibration, oil leakage, or abnormal hydraulic pressure during the operation of the steering gear apparatus		
8. Tests all alternate systems, alarms and indicators		
rudder angle indicator (with both mechanical scale and bridge indicator)		
motor pilot (running) light		
feeder circuit breaker open		
feeder circuit fuse open		
motor overload		
electrical power failure to steering gear control system		
power failure to steering gear power unit		
low hydraulic oil level		
phase failure (3-phase power supply)		
steering failure alarm		
8. Correctly describes actions as they are being performed		
9. No safety violations are observed		

### ***Starting up a refrigeration system***

1. Checks oil level in compressor crankcase and takes required corrective actions		
2. Lines up condenser seawater circulating system		
3. Opens valves in suction and discharge lines		
4. Closes condenser water vents and drains		
5. Lines up refrigerant system valves for normal system operation		
6. Leaves compressor suction stop valve closed		

7. Starts seawater circulating through condenser		
8. Vents air from condenser water heads		
9. Starts fans in refrigerated compartments		
10. Starts pumps in brine or chilled water systems		
11. Checks electrical power supply to compressor and solenoid valves		
12. Ensures suction and discharge are open		
13. Starts compressor in "Automatic" mode		
14. Observes system operation carefully for at least five minutes		
15. Checks oil level in compressor crankcase and takes corrective actions if necessary		
16. Correctly describes actions as they are being performed		
17. No safety violations are observed		

### ***Securing refrigeration system***

1. Closes main liquid line stop valve and allows compressor to run until properly de-energized by low pressure switch		
2. Secures power to compressor motor		
3. Secures condenser seawater circulating system		
4. Closes all appropriate refrigeration valves		
5. Correctly describes actions as they are being performed		
6. No safety violations are observed		

### ***Starting an air compressor***

1. Checks oil reservoirs and (if necessary) fills to proper level with correct grade of oil		
2. Sets overspeed tripping device (if provided)		
3. Ensures power off and jacks compressor over by hand, if applicable		
4. Turns on cooling water to the cooling system		

5. Vents system properly		
6. Opens all air system stop valves		
7. Drains and removes all accumulations of moisture or oil from the separators		
8. Correctly describes actions as they are being performed		
9. No safety violations are observed		

***Securing air compressor***

1. Turns power off		
2. Turns off cooling water to cooling water system		
3. Vents system properly		
4. Closes all air system stop valves		
5. Correctly describes actions as they are being performed		
6. No safety violations are observed		

***Starting up and placing fresh water generator on line***

1. Lines up salt water feed system and starts salt water feed pump to fresh water distiller		
2. Lines up brine overboard system and starts brine overboard pump		
3. Adjusts brine overboard discharge valve to maintain proper level in bottom of flash chambers		
4. Opens steam root valve to distiller unit steam air ejectors (or starts vacuum pp.)		
5. Opens steam supply valve to salt water feed heater after salt water feed heater shell vacuum is greater than 75% of normal operational vacuum		
6. Applies and regulates de-superheater if steam supply is provided to salt water feed water heater		
7. Lines up and regulates salt water feed heater low pressure drain as required		
8. Adjusts salt water flow to maintain minimum temperature of 165° F to first stage		



9. Observes feed water spray pattern and water level at bottom of flash chamber		
10. Regulates brine overboard pump discharge to maintain seal and brine level in first and second stages		
11. Energizes salinity indicating panel and verifies three-way dump valve is tripped and discharging to bilge		
12. Starts distillate pump when pump static suction line gage glass is at least half full		
13. Adjusts salt water feed temperature and brine overboard flow rate to correct levels and rates; monitors distillate pump output salinity level		
14. Verifies tanks to be replenished are lined-up		
15. Engages three-way dump valve when distillate level is below 4.24 PPM		
16. Records meter reading once discharge to tanks has been established		
17. Verifies salinity meter reading by chemical test comparison with distillate sample		
18. Correctly describes actions as they are being performed		
19. No safety violations are observed		

***Securing fresh water generator system***

1. Closes steam supplies valve to salt water		
2. Closes steam. root valve to distiller unit steam air ejectors (or stops vac. pp.)		
3. Secures condensate pump		
4. Closes condensate pump discharge valve and desuperheater control valve		
5. Secures distillate pump		
6. Closes distillate pump discharge valve		
7. Secures feed and brine pumps and close feedwater inlet valve and brine pump discharge valve		
8. Drains unit if shutdown is for a prolonged period		
9. Correctly describes actions as they are being performed		
10. No safety violations are observed		

*Starting a lube or fuel oil purifier*

1. Verifies brake has been released		
2. Checks purifier sump oil level and adds oil as necessary		
3. Ensures discharge pump outlet valve open to proper tank		
4. Depresses start button to start purifier motor		
5. Uses speed indicator to ensure that purifier has reached operating speed		
6. Adds sealing/priming water until overflow is detected at heavy phase discharge; runs machine through a shoot cycle		
7. Opens lube/fuel oil feed pump inlet valve from proper tank		
8. Opens steam supply to preheater		
9. Observes cessation of sealing/priming water displacement of purifier		
10. Monitors increase of lube/fuel oil temperature; adjusts to proper oil temperature and flow rate.		
11. Observes pollution prevention requirements		
12. Correctly describes actions as they are being performed		
13. No safety or pollution violations are observed		

*Securing a lube or fuel oil purifier*

1. Secures steam to lube/fuel oil pre heater		
2. Secures lube/fuel oil inlet valve from tank		
3. Runs machine through a shoot cycle; secures sealing/priming water leaving bowl open		
4. Depresses stop button at purifier motor controller		
5. Verifies purifier has come to a complete stop		
6. Closes discharge pump outlet valve; places brake on purifier		
7. Observes pollution prevention requirements		

8. Correctly describes actions as they are being performed		
9. No safety or pollution violations are observed		

***Preparing main diesel engine operation for departure***

1. Completes all necessary checks on cooling water system and associated equipment		
(a) Checks all valves to ensure system is lined up for operation		
(b) Starts required motor-driven cooling water pump, if provided or necessary		
(c) Ensures systems have adequate pressure and flow available		
(d) Vents cooling water heat exchangers, using the vent cocks or vent valves on the heat exchanger shells		
(e) Re-checks water level in fresh water expansion tanks for adequacy		
(f) Verifies above actions are indicated on control panel		
2. Completes all necessary checks on lube oil system		
(a) Checks all valves and pumps are lined up for proper operation		
(b) Ensures cooling water system is on line and operational		
(c) Checks sump level for adequate supply		
(d) Checks all necessary temperatures and pressures for normal operating conditions		
(e) Verifies above actions are indicated on control panel		
3. Checks for open indicator cocks and rotates engine on jacking gear		
4. Checks indicator cocks for water – Disengages jacking gear		
5. Checks all auxiliary equipment, turbo-charger, auxiliary boiler and sub systems are readied and properly lined up		
6. Completes all necessary checks on the air system		
(a) Checks to ensure all tanks are charged		
(b) Checks valves to ensure system is properly lined up		

(c) Checks compressor for proper line up and operation		
(d) Checks associated systems (reducers, dryers) for proper operation and flow		
(e) Verifies above actions are indicated on control panel		
7. Performs blowdown		
8. Takes appropriate actions to eliminate moisture		
9. Restores valves and cocks to their operating positions		
10. Verifies all system indicators and alarm systems for proper operations – Starts mist detector(s)		
11. Completes all necessary checks on fuel oil system		
(a) Lines up and primes fuel system		
(b) Checks to ensure sufficient clean fuel for anticipated engine operation is available; starts fuel oil purifier systems and transfer system		
(c) Checks heaters, filters, and pumps for acceptable operations		
(d) Vents heaters		
(e) Checks temperatures and pressure for normal operating conditions		
(f) Verifies above actions are indicated on control panels		
12. Starts engine, following all proper procedures for the type of starting system in use and in accordance with the manufacturer's recommendations, ship's procedures and standing orders.		
13. Verifies voice communication, correct time and EOT setting with bridge		
14. Correctly describes actions as they are being performed		
15. No safety violations are observed		

***Securing an operating main diesel engine***

1. Acknowledges EOT order for securing		
2. Stops engine in accordance with the manufacturer's procedures and recommendations		
3. Secures start air system (electrical or air) following all proper procedures for the type of system in use and in accordance with the manufacturer's		

recommendations, ship's procedures and standing orders;		
4. Completes post lubrication and cool down procedures as per manufacturer's instructions		
5. Opens indicator cocks		
6. Secures or adjusts lube oil, fuel oil, and cooling water systems as required or meets anticipated needs by keeping required systems running		
7. Verifies above actions are indicated on control panel		
8. Correctly describes actions as they are being performed		
9. No safety violations are observed		

***Preparing a main steam turbine engine for maneuvering and control***

1. Checks system line-up and starts main lube oil pump		
2. Verifies flow through gravity tank overflow line using sight glass		
3. Verifies lube oil flow for all main engine and reduction gear bearings using sight glass		
4. Engages jacking gear to main engine		
5. Makes notification of jacking gear status		
6. Turns on jacking gear motor		
7. Establishes steam flow to gland seal regulator and adjusts to 1.5 psig		
8. Verifies main circulator high suction and overboard discharge valves are open		
9. Starts main circulator pump		
10. Opens main condenser salt water header vents until flow is observed		
11. Verifies main condensate pump suction and discharge stop valves are open		
12. Verifies main condensate pump vent line valve is open		
13. Cracks open main condensate recirculating valve to ensure condensate flow through air ejector condenser		
14. Starts main condensate pump		
15. Opens inlet/outlet valves to both first and second stage air ejector elements		

16. Lines up steam to air ejector pressure reducing station		
17. Opens steam root valve to second stage main air ejector element		
18. Starts gland exhaust condenser fan		
19. Observes progressive increase in vacuum		
20. Inspects entire system for proper operation		
21. Correctly describes actions as they are being performed		
22. No safety violations are observed		

***Monitoring main steam turbine engine while underway***

1. Checks all main engine and reduction gear bearing thermometers to detect signs of overheating		
2. Checks oil sight-flow indicators for proper oil flow		
3. Checks clearance indicators for proper rotor position		
4. Checks all thermometers, pressure gages and vacuum gages for readings within operating ranges		
5. Checks and maintains proper oil level in main sump according to ship's procedure		
6. Maintains proper water level in de-aerating feed tank		
7. Constantly monitors salinity indicators		
8. Checks lube oil temperature from lube oil cooler, maintains oil temperature at 110°F to 130°F		
9. Checks pressure of cooling water main		
10. Constantly alert for and reports unusual sounds and vibrations		
11. Correctly describes actions as they are being performed		
12. No safety violations are observed		

***Assists in securing main steam turbine engine at Finished With Engines***

1. At "Finished With Engines", secures the main steam stops		
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2. Uses Ahead and Astern throttles to bleed off steam trapped in main steam lines		
3. Secures bulkhead stop		
4. Secures Astern guarding valve		
5. Verifies that the shaft is no longer rotating		
6. Engages and starts jacking gear when directed		
7. Posts sign stating that main engine jacking gear is engaged		
8. Verifies that lube oil system continues to operate		
9. Verifies turbine bearing sight glasses indicate lube oil flow		
10. Verifies that lube oil temperature at each bearing is below 160°F		
11. Verifies that lube oil cooler outlet temperature is maintained at not less than 110°F		
12. Verifies that each line shaft bearing oil ring is free to rotate		
13. When directed, stops and disengages jacking gear, and secures lube oil system		
14. No safety violations are observed		

***Assisting in lighting off a main boiler***

1. Completes all steps necessary to prepare boiler for light off and raising steam pressure		
(a) Ensures boiler is closed (drums, headers and furnace)		
(b) Checks boiler water level; closes bottom blow, surface blow and any header drains		
(c) Opens steam drum vent (air cock), superheater vents and drains		
(d) Lines up boiler properly; checks that periscope has operating light bulb		
2. Initiates proper procedure for lighting-off main propulsion boiler		
(a) Ensures auxiliary and main feed checks are closed;		
(b) Opens/closes boiler water level gauge glass drain noting water movement in glass;		
(c) Makes up atomizer with small sprayer plate and installs in centrally located register;		

(d) Opens root valve on installed burner;		
(e) Ensures burner and root valves are closed;		
(f) Lines up fuel oil system to recirculate through heater. Checks fuel oil temperature, and reports when at proper temperature as stipulated by the watch engineer;		
(g) Adjusts fuel oil pressure;		
(h) Checks air damper and register doors		
(i) Starts forced draft fan, and purges furnace;		
(j) Opens burner root valve		
(k) Lights torch;		
(l) Inserts torch through manual light-off opening;		
(m) Stands clear of open register doors		
(n) Holds torch near and just under atomizer tip;		
(o) Cracks open burner valve;		
(p) Checks for ignition;		
(q) Opens burner valve wide when ignition occurs and fire stays lit (closes burner valve and purges furnace if ignition does not occur or if fire goes out);		
(r) Withdraws torch;		
(s) Inspects fire through peep hole;		
(t) Secures fuel oil re-circulating line and adjusts pressure for proper flame;		
(u) Checks periscope for smoke and adjusts fuel/air ratio as needed for clear stack;		
(v) Notifies watch engineer of any unusual or unsafe conditions;		
(w) No safety violations are observed.		

### ***Securing a main boiler***

1. Requests and receives permission to secure the main boiler		
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2. Opens superheater vents to maintain steam flow; cracks superheater drains when pressure is nearly zero		
3. Secures oil to burners and cuts fires		
4. Leaves air registers opened to make certain all oil has been burned and furnace gases purged; care is taken not to cool furnace too rapidly.		
5. Secures forced draft fan and closes damper		
6. Removes atomizer for later cleaning		
7. Secures main and auxiliary steam stops, as boiler steam pressure drops		
8. Opens steam drum vent (air cock) when pressure has dropped to about 50 PSI		
9. Maintains proper water level as boiler is being cooled		
10. Correctly describes actions as they are being performed		
11. No safety violations are observed		

***Performing a "blow down" (double shut-off test) of a water gage glass to check water level***

1. Closes top cutout valve and opens drain at the bottom assembly		
2. Opens top cutout valve and closes bottom cutout valve		
3. Closes drain valve		
4. Opens bottom cutout valve to allow water to enter the gage		
5. Checks water level against the level shown on the other gage or on the remote water level indicator		
6. Correctly describes actions as they are being performed		
7. No safety violations are observed		

***Responding to a high water level casualty***

1. Shuts off oil supply to all burners via the quick closing valve		
2. Closes feed check valve		
3. Opens superheater vent valve		
4. Closes boiler main steam stop valve		

5. Secures force draft fan		
6. Closes damper and all burner register doors		
7. Opens blowdown skin valve and surface blowdown valve		
8. Monitors water level in sight glass		
9. Closes surface blow valve and skin valve when water level falls to normal		
10. Opens superheater drains to expel any carry over		
11. Correctly describes actions as they are being performed		
12. No safety violations are observed		

***Responding to a low water level casualty***

1. Shuts off the oil supply to all burners via the quick closing valve		
2. Closes the feed check valve		
3. Opens superheater vent valve		
4. Closes boiler main steam stop valve		
5. Secures force draft fan		
6. Closes damper and all burner register doors		
7. Correctly describes actions as they are being performed		
8. No safety violations are observed		

***Transferring fuel oil***

1. Determines fuel oil storage, settling or service tank levels		
2. Lines up fuel oil transfer pump and fuel oil manifold to take a suction on the desired fuel oil storage tank or fuel oil settling tank as directed		
3. Lines up fuel oil transfer pump to discharge to the desired settling or service tank as directed		
4. Starts fuel oil transfer pump		
5. Checks fuel oil transfer pump suction and discharge pressures to determine that the pump picks up suction		

6. Monitors fuel oil service, settling or service tank levels; especially tank being pumped to		
7. Stops fuel transfer pump when fuel settling or service tank approaches full		
8. Restores fuel transfer system line-up back to normal		
9. No safety or pollution are observed		

### ***Deballasting operations***

1. Lines up ballast pump suction manifold to take a suction on the ballast tank fill and drain manifold (or to take a direct suction, as required)		
2. Lines up ballast pump discharge manifold to direct flow of ballast water overboard		
3. Lines up ballast tank fill and drain manifold from ballast tank(s) to be pumped out, as directed		
4. Starts ballast pump, checks suction and discharge pressures and pump operation		
5. Stops ballast pump when tank(s) is/are empty or when directed to stop.		
6. Restores ballast system line-up back to normal		
7. No safety or pollution are observed		

### ***Ballasting operations***

1. Lines up ballast pump suction manifold and /or suction piping to take a suction on an appropriate seachest		
2. Lines up ballast pump discharge manifold and/or piping to direct flow to the ballast tank fill and drain manifold, if necessary		
3. Lines up ballast tank fill and drain manifold to ballast tank(s) as directed		
4. Starts ballast pump, checks suction and discharge pressures and pump operation		
5. Stops ballast pump when tank(s) are full or when directed to stop		
6. Restores ballast system line-up back to normal		
7. No safety or pollution are observed		

***Pumping out engine room bilge wells***

1. Sounds bilge water collecting tank to insure it is capable of accommodating bilge water without overflowing		
2. Lines up bilge system to take a suction from desired bilge well, and discharge to the bilge water collecting tank		
3. Primes bilge pump if necessary		
4. Starts bilge pump, and monitors pump and motor		
5. Monitors bilge pump suction and discharge pressure gauges to ensure bilge pump has picked up suction		
6. Monitors bilge and well levels		
7. Stops bilge pump when bilge well has been pumped dry		
8. Restores bilge system valve line up back to normal		
9. No safety or pollution are observed		

***Pumping out cargo space or shaft alley bilge wells***

1. Sounds bilge water collecting tank to ensure it is capable of accommodating bilge water without overflowing		
2. Lines up bilge system to take a suction from desired bilge well, and discharge to the bilge water collecting tank		
3. Primes bilge pump if necessary		
4. Starts bilge pump, and monitors pump and motor		
5. Monitors bilge pump suction and discharge pressure gauges to ensure bilge pump has picked up suction		
6. Monitors bilge and well levels		
7. Stops bilge pump when bilge well has been pumped dry		
8. Restores bilge system valve line up back to normal		
9. No safety or pollution are observed		

***Starting an Emergency Generator***

1. Properly conducts pre-start routine inspection of emergency diesel generator (Checks fuel tank and lube oil sump level, battery or accumulator charge level, radiator level, air intake for radiator no blocked, external inspection, etc)]		
2. Correctly starts and operates generator in accordance with the manufacturer's instructions or approved procedure		
3. Correctly describes actions as they are being performed		
4. No safety violations are observed		

***Conducting a pre-start inspection of a diesel generator***

1. Inspects generator for loose cable connections, brush rigging as fitted and foreign or loose items that may damage unit during start up		
2. Inspects couplings between reduction gear and alternator for readiness		
3. Inspects governor linkage, reduction gear casing, and bearing housings for indications of lubrication leaks		
4. Manually trips overspeed and resets trip to determine if mechanism operates without binding		
5. Checks level of lube oil in sump and adds necessary lube oil		
6. Starts pre lube pump checks for pressure leaks and proper flow		
7. Secures fuel, opens indicator cocks and rolls over engine. Close indicator cocks and open fuel supply.		
8. Correctly describes actions as they are being performed		
9. No safety violations are observed		

***Conducting a pre-start inspection of steam turbo generator***

1. Inspects generator for loose cable connections, brush rigging as fitted and foreign or loose items that may damage unit during start up		
2. Inspects couplings between reduction gear and alternator for readiness		
3. Inspects governor linkage, reduction gear casing, and bearing housings for indications of lubrication leaks		
4. Manually trips overspeed and resets trip to determine if mechanism operates		

without binding		
5. Checks level of lube oil in sump and adds oil as necessary; starts pre-lube pump		
6. Starts auxiliary circulator		
7. Vents condenser heads and reports stability of circulated water pressure		
8. Starts auxiliary condensate pump		
9. Adjusts recirculating valve to maintain visible level of condensate in hot well		
10. Applies gland seal steam to turbine rotor		
11. Admits operating steam to air injectors, adjusting supply pressure as necessary		
12. Determines visible level in hot well, adjusting recirculating valve as necessary		
13. Correctly describes actions as they are being performed		
14. No safety violations are observed		

***Starting and connecting ship's service diesel generator to main switchboard (Dead ship)***

1. Completes pre-start routine and inspection of emergency diesel generator		
2. Conducts inspection to insure all support systems are lined up to operate emergency generator		
3. Starts generator and operates in accordance with the manufacturer's instructions		
4. Disconnects all large and unnecessary loads from switchboard		
5. Closes circuit breaker		
6. Monitors, brings loads in reverse order (large to small)		
7. Correctly describes actions as they are being performed		
8. No safety violations are observed		

***Paralleling an in-coming unit with operating unit***

1. Adjusts voltage of in coming machine approximately 5-10 volts higher than bus		
2. Turns synchroscope on to in-coming machine and correctly observes direction and speed of rotation		

3. Adjusts speed and direction of rotation of synchroscope (slowly in the “fast” direction) by prime mover governor control		
4. Closes oncoming unit breaker to stop synchroscope at 12 o’clock position; turn synchroscope “off”		
5. Divides kW load and reactive load (equally, in most cases) using governor controls, voltage regulator adjustments, and available switch board meters		
6. Correctly describes actions as they are being performed		
7. No safety violations are observed		

***Performing maintenance on a centrifugal pump***

1. Isolates and dismantles centrifugal pump in accordance with manufacturer’s instructions and recommended procedures		
2. Examines components for wear, damage, or deterioration		
3. Re-fits component, checking end clearances and backlash		
4. Replaces and adjusts seals properly, or replaces packing		
5. Reassembles pump correctly		
6. Tests and runs pump making necessary adjustments to achieve satisfactory operation		
7. Actions are described correctly as they are being performed		
8. Actions taken lead to full restoration of centrifugal pump by methods most suitable and appropriate to the prevailing circumstances and conditions		
9. No safety violations are observed		

***Performing maintenance on a reciprocating pump***

1. Isolates and dismantles reciprocating pump in accordance with manufacturer’s instructions and recommend procedures		
2. Examines components for wear, damage, or deterioration		
3. Re-fits components		
4. Replaces and adjusts seals properly, or replaces packing		

5. Reassembles pump correctly		
6. Tests and runs pump making necessary adjustments to achieve satisfactory operation		
7. Actions are described correctly as they are being performed		
8. Actions taken lead to full restoration of reciprocating pump by methods most suitable and appropriate to the prevailing circumstances and conditions		
9. No safety violations are observed		

***Performing maintenance on a piping system***

1. Removes any lagging, shrouding or insulation		
2. Correctly identifies contents of pipe		
3. Isolates section of pipe and “tags out” properly		
4. Relieves pressure and drains pipe section		
5. Dismantles flanges, screw connections, etc.		
6. Cleans and inspects internally		
7. Cleans and prepares joint faces for reassembly		
8. Selects and applies appropriate jointing material		
9. Reassembles correctly		
10. Checks pipe supports for adequacy		
11. Hydraulically tests for leaks		
12. Replaces any lagging and shrouding removed earlier		
13. Correctly describes actions as they are being performed		
14. Actions taken lead to the full restoration of piping system by methods most suitable and appropriate to the prevailing circumstances and conditions		
15. No safety violations are observed		

***Performing maintenance on valve***

1. Isolates and dismantles valve in accordance with manufacturer’s instructions and		
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recommended procedures		
2. Examines seats, valve, spindles, and glands for proper operating condition		
3. Correctly machines valve and seats		
4. “Beds in” valve on seats using grinding paste		
5. Removes defective or worn gland packing		
6. Selects correct gland packing replacement		
7. Repacks gland properly		
8. Reassembles valve correctly		
9. Tests valve for leaks and proper operation		
10. Correctly describes actions as they are being performed		
11. Actions taken lead to the full restoration of valves by methods most suitable and appropriate to the prevailing circumstances and conditions.		
12. No safety violations are observed		

***Performing overhaul on heat exchanger***

1. Isolates and dismantles heat exchanger in accordance with manufacturer’s instructions and recommend procedures		
2. Dismantles and examines for leakage, corrosion, erosion, or fouling		
3. Checks provision for tube expansion		
4. Descales, replaces tubes, plugs tubes, secures tube tightness in tube sheets, and checks means for reducing corrosion		
5. Reassembles heat exchanger correctly		
6. Fills and tests exchanger		
7. Correctly describes actions as they are being performed		
8. Actions taken lead to the full restoration of heat exchanger by methods most suitable and appropriate to the prevailing circumstances and conditions.		
9. No safety violations are observed		

***Draining scavenging air receivers of oil accumulation***

1. Places suitable container at scavenging air receiver drain to collect oil drippings		
2. Opens scavenging air receiver drains		
3. Observes oil outflow from drain for discoloration from water or metallic particles		
4. Closes drain when oil ceases to flow		
5. Removes oil drippings container and properly disposes of oil		
6. Reports any abnormal conditions		
7. Correctly describes actions being executed as they are being performed		
8. No safety violations are observed		

***Performing routine maintenance on start and clutch air system***

1. Checks operation of automatic moisture separators		
2. Drains moisture separators manually by cracking open drain valve		
3. Observes condition of drainage to detect any evidence of oil/water emulsions		
4. Drains moisture from start air tanks by cracking moisture drain		
5. Blows down any "Y"-type compressed air strainers to expel entrained dirt and scale		
6. Correctly describes actions as they are being performed		
7. Actions taken lead to the full restoration of start and clutch air system by methods most suitable and appropriate to the prevailing circumstances and conditions.		
8. No safety violations are observed		

***Monitoring sanitary flushing system***

1. Checks plant operational status		
2. Checks source and pressure of sanitary flushing water pump		
3. Checks pump packing gland proper leak off or mechanical seal for leakage		
4. Checks sea suction strainer pressure drop		

5. Checks sanitary flushing water header tank level and pressure		
6. Reads and records operating parameters		
7. Reports any abnormal conditions		
8. Observes pollution prevention requirements		
9. Correctly describes actions as they are being performed		
10. No safety or pollution violations are observed		

***Monitoring sewage waste treatment plant***

1. Checks plant operating status		
2. Checks destination of “black water” sewage and ensures compliance with pollution prevents requirements		
3. Checks pressure and mechanical seal leakage of sewage circulating and overboard discharge pumps		
4. Checks air compressor discharge pressure		
5. Checks level of chemical treatment batch tank		
6. Reads and records operating parameters		
7. Reports any abnormal conditions		
8. Correctly describes actions as they are being performed		
9. No safety violations are observed		

***Monitoring an oily water separator system***

1. Checks plant operating status		
2. Checks bilge water tank level		
3. Checks oily water separator chamber pressure		
4. Checks filling and displacement water supply pressure		
5. Checks oil concentration of overboard discharge water		
6. Reads and records operating parameters		

7. Reports abnormal conditions, takes corrective actions if needed		
8. Observes pollution prevention requirements		
9. Correctly describes actions as they are being performed		
10. No safety or pollution violations are observed		